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Information technology, cumulative causation and patterns of globalization in the third world

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ABSTRACT

While recognizing the importance of a wide range of influences on current patterns of globalization in developing countries, this paper focuses on the role played by information technologies of various kinds. It is argued that these technologies are associated with a number of powerful cumulative mechanisms causing some countries to grow rapidly and others to become increasingly marginalized from the global economy. These differential effects of information technology on patterns of globalization are better viewed from the perspective of Myrdal's notion of cumulative causation than from the standpoint of standard economic theory

KEYWORDS

Information technology; globalization; inequality; developing countries.

1 INTRODUCTION

The purpose of this paper is to analyse the economic characteristics of information technology (defined broadly to include not only new forms of communications but also industrial machinery), and thereby gain a better understanding of its probable effects on the global economy. Although technical change in general and information technology in particular, are now widely accepted as being important determinants of productivity and growth within particular countries, their effects on the patterns of the global economy have yet to be systematically analysed. In attempting this task our goal is not at all, however, to make the case for technological determinism i.e. the notion that technology is the sole influence over these patterns of global integration. Our argument is rather, that if poor countries are to exploit the advantages afforded by information technology for integrating themselves more fully into the

global economy, they will need to be fully conversant with its numerous characteristics and the resulting impulses that it is likely to propagate (such as, for example, how it will alter the nature of global competition and the locational behaviour of multinational corporations).

Thus, while we fully acknowledge the wide range of influences – sociological, political and economic – that provide the context in which technology exerts its ultimate influence on the global economy, we also feel that there is something to be gained by simplifying this hugely complex pattern of relationships (which, in any case, have been described in several very lengthy books on the topic), and focusing instead on a narrower (and comparatively neglected) set of issues that will be of considerable relevance to politicians and other officials in developing countries which are entrusted with the formulation of policy towards information technology. Indeed, as specifically argued below, one reason why the NICs, more than any other group of developing countries, have been so successful in exploiting the advantages of global integration is that these countries have fully understood the strategic characteristics of information technologies and the cumulative interactions between them. Among other things, for example, countries such as Korea, Singapore and Taiwan recognized that:

Competition in an ongoing technological revolution calls for new concepts and principles beyond those offered by the traditional national comparative advantage. The informatics industry can lead the growth and technological transformation of whole economies. It also is characterized by intense global competition, fast technological change, complementarities and links and uncertainties. These characteristics require, exact timing for market entry, anticipation of core capabilities, continuous technology learning, and development of supporting institutions and infra-structures.

(Hanna *et al.*, 1996: 186)

2 PATTERNS OF GLOBALIZATION IN THE THIRD WORLD¹

The uneven degree to which developing countries have participated in the growth of foreign trade and investment (as a percentage of total world output) has been thoroughly documented in a 1996 publication by the World Bank entitled *Global Economic Prospects and the Developing Countries*. All we shall attempt to do here therefore is to give the reader an impression of just how uneven this process has in fact been.

With regard first to foreign trade, the afore-mentioned publication notes that over the past decade the 'overall ratio of trade to GDP [in

the developing countries] – a common measure of integration – rose 1.2 percentage points a year' (World Bank, 1996: 20). Yet this average increase for the developing world as a whole was heavily concentrated among a small group of countries in East Asia, Latin America and the Caribbean. More precisely, the World Bank data indicate that as much as 'three-quarters of the increase was accounted for by just ten countries' (World Bank, 1996: 21). Over the same period, however, the trade ratios actually fell in no fewer than 44 out of the 93 developing countries studied by the World Bank. These globally disintegrative experiences were recorded for the most part in countries from the Middle East and Africa.

An equally extreme picture emerges from the World Bank data on the foreign investment component of globalization. For, while developing countries as a group experienced a rise in their share of global foreign direct investment, there were pronounced variations around this average performance.

On the one hand, it is again among a small group of countries that the gains tend to be concentrated. Just 8 (mainly Asian) countries, for example, 'that account for 30 per cent of developing country GDP garnered two thirds of overall FDI flows in 1990–93' (World Bank, 1996: 22). On the other hand and again in parallel with the variations around the average trade to GDP ratio among developing countries, a relatively large number of such countries experienced falling ratios of foreign investment to GDP. In particular, 'Over the past decade ratios of FDI to GDP fell in thirty-seven of the ninety-three countries studied. Of these twenty were in Sub-Saharan Africa, nine were in Latin America and the Caribbean and seven were in the Middle East and North Africa' (World Bank, 1996: 22).²

3 GLOBALIZATION AS A TECHNOLOGICAL PHENOMENON

As defined above, globalization is due partly to factors that are unrelated to technological change in general or information technology in particular. Perhaps the most important of these other factors is the more liberal approach to international trade and foreign investment that has been adopted in many countries, developed as well as developing. As noted above, however, from the point of view of science and technology policy in developing countries, it is useful to abstract from all these other influences on globalization and focus instead on the respects in which globalization can be described as a technological phenomenon. It is useful to make this case in turn under four main headings, each of which, we will note, tends to involve different types of information technology.

Communication technology and international trade

The level of international trade depends not only on transport costs but also on the costs of communication between buyers and sellers in different countries. But whereas nineteenth-century globalization tended to be driven by falling transport costs, it is now mainly the result of a drastic reduction in communication costs. According to the World Bank (1995) for example, the costs of an international telephone call have fallen by a factor of six between 1940 and 1970 and a factor of 10 between 1970 and 1990. In fact, there are two distinct mechanisms through which globalization is currently being driven by a reduction in communication costs. The first and more obvious mechanism is that because of technologies such as digital switching, fax machines and the Internet, information about already traded goods can be communicated between countries much more cheaply than was hitherto possible. This is manifest, among other ways, in the growth of electronic commerce between businesses, the digital delivery of goods and the retail sale of tangible goods (US Department of Commerce, 1998).³ The second mechanism, by contrast, concerns the ability of information technology to bring certain services that were formerly non-tradable into the realm of tradability:

In particular, rapid technological developments in telecommunications and computers in the 1980s have made some services, especially information-intensive ones, more tradable by providing 'the means for overcoming the inherent obstacle to trade in many services... the intangibility, non-storability, and hence non-transportability of these services.

(UNCTAD, 1996: 105)

Information technology as a source of comparative advantage

According to the standard Heckscher–Ohlin model of international trade, neither technical change in general nor information technology in particular would exert an influence over the patterns of trade that are associated with globalization (to which we referred above). For in that model it is differences in factor and resource endowments, rather than differences in production functions that determine the comparative advantages enjoyed by different countries. Yet, as Krugman has pointed out, empirical tests of the Heckscher–Ohlin model 'have consistently yielded negative results' (Krugman, 1995: 345). The evidence indicates, rather, that 'patterns of comparative advantage are largely driven by international differences in production functions. That is, technological differences are a major engine of trade' (Krugman, 1995: 345–6). To this extent, therefore, it is reasonable to assume that information technology will indeed influence the comparative advantage of countries; some

countries, that is to say, will become more competitive as a result of adopting industrial technologies such as CAD/CAM or numerically controlled machine tools, while other countries will tend to lag behind and may even suffer a consequent loss of competitiveness in markets where they compete with adopting countries.

International trade in information technologies

So far we have been concerned with the *use* of information technologies in promoting globalization and shaping the form that it is likely to take. These technologies, however, are also produced and exported by developing countries and as such contribute to the trade component of total world output. In fact, since international trade in many types of information technology (such as office and telecommunications equipment) has been growing more rapidly than trade in most other products, it has, in effect, helped to raise the overall ratio of trade to total global output (it has helped, that is to say, to promote the trade component of globalization). Between 1983 and 1993, for example, trade in office and telecommunications equipment grew more rapidly than all other sectors (James, 1999).

Information technology and foreign direct investment

As we have defined the term, however, globalization also refers to the increasing ratio of foreign investment to world output and we need accordingly to ask how this component of globalization has been affected by information technologies of one kind or another.

For this purpose, one can do no better than to quote from Dunning and Narula (1996) on how information technology has enhanced the ability of multinational corporations to coordinate their cross-border activities. In their view:

It is a fundamental feature of MNE [multinational enterprise] activity that cross-border market failure exists in the supply of intermediate products, and especially intangible assets. ICT [information and computer technologies] has reduced both the costs of acquiring and disseminating information, and the transaction and coordination costs associated with cross-border activity. This is on at least two levels. First, information about both input and output markets is more easily accessible. This allows firms which previously could not engage in international business transactions now to do so. . . . Second, MNEs are better able to integrate the activities of their various affiliates through the use of these technologies and to more quickly respond to changing conditions in the countries in which they operate. Taken together, these transaction-cost

reducing processes have enabled MNE activity to be much more efficiently organised across borders.

(Dunning and Narula, 1996: 8–9)

Such activity, one should note, refers not only to the production of goods and services by foreign affiliates but also to expenditures by them on R&D. Note too, that the influence of information technology on the global activities of multinationals is not confined to the patterns of intra-firm behaviour described in this quotation. For, information technologies such as fax machines, e-mail and software programs also allow 'substantial cost-savings in the coordination and monitoring costs associated with *inter-firm* networks (Dunning and Narula, 1996: 9, emphasis in the original). Partly for this reason one can discern a growing tendency for multinational firms to engage in strategic alliances of one kind or another, especially, but not only in the field of information technology itself (Freeman and Hagedoorn, 1995).

4 USING INFORMATION TECHNOLOGY TO PROMOTE GLOBALIZATION: A TYPOLOGY OF POLICIES

The first column of Table 1 contains a summary of the mechanisms that were described in the previous section, while the second column indicates the type(s) of information technology to which each such mechanism mainly refers. This information, however, pertains only to the *potential* influence of these technologies on the nature and extent of globalization. Whether this potential is *actually* realized depends partly (as noted earlier) on the initial conditions prevailing in particular developing countries (with respect, for example, to the capacity to invest in and absorb the new technology). But the degree to which the potential for globalization afforded by this technology is actually realized, also depends on the policies adopted by particular countries with respect to each of the rows shown in Table 1.

This important point can perhaps be made most cogently by contrasting the group of developing countries that has most purposively promoted information technology as an instrument of globalization, with the group that has done least in this regard. The former category refers primarily to the East Asian NICs which have adopted a wide range of policies with respect to each and every one of the mechanisms shown in Table 1. The second category includes a much larger number of countries, mainly, but not entirely in sub-Saharan Africa, that has done little or nothing to exploit the potential of information technology as a means of globalization, along those same dimensions. In this way, such initial conditions as favoured the former category over the latter in exploiting the new technologies became more pronounced and the resulting gap

was accentuated still further by the cumulative patterns of causation that will be described in the following section.

It is well beyond the scope of this paper to document all the respects in which the East Asian NICs have used information technology as a means of integrating themselves ever more closely into the global economy. What we have done instead is to list in the third column of Table 1 some of the most important such policy measures, corresponding to each of the mechanisms through which information technologies of various kinds promote globalization. The first entry in that column, relating to digital switching technology, warrants special emphasis partly because of the centrality of telecommunications to most other areas of information technology and partly because the NIC experience in this regard demonstrates that technological leapfrogging is indeed possible under certain circumstances.

Switching technology forms the central part of the telecommunications network and the electronics or digital version of this technology is superior in many respects to the older electro-mechanical switching systems. Being more easily built from scratch than integrated into the older systems, however, electronic switching was more readily accessible to (developing) countries that (unlike the developed countries) were not yet burdened by large pre-existing stocks of those older systems. Indeed, developing countries were given 'a remarkable opportunity to completely leapfrog the electromechanical technology, avoiding the expense of replacing obsolete (though young in age) capital stock and problems of technological cumulativity, and start their telecommunications infrastructure from scratch' (Antonelli, 1990: 71). This opportunity was grasped mainly by the Asian NICs which indeed were able to leapfrog by assimilating the new technology more rapidly than the developed countries. 'The most striking case is that of South Korea, where diffusion reached the 10 per cent benchmark in 1981, four years after the United States, but then reached 70.3 per cent in 1987. . . . Singapore started from a low of 5 per cent in 1977, to arrive at 64.5 per cent in 1987' (Antonelli, 1990: 44). Partly on account of the technological leapfrogging thus achieved, the NICs were able to record very rapid rates of growth in the number of main telephone lines per 100 inhabitants. South Korea, for example, 'multiplied its number of main lines by five, jumping from 4.2 per cent in 1977 to 20.7 per cent in 1987' (Antonelli, 1990: 71).

If in this and the other policy areas listed in Table 1, the NICs were therefore able to use information technology so effectively as a means of integrating themselves into the global economy, there were many other countries that had barely formulated any sort of coherent policy response to the new technologies. Indeed, according to one observer of the Africa region, for example, 'The guidance of policy makers has made telecom operations management inefficient and incompetent in decision

Table 1 Information technology policies to promote globalization in the NICs

<i>How globalization is promoted</i>	<i>Form of information technology</i>	<i>Selected policies used by the East Asian NICs</i>
Trade is promoted by a reduction in communication costs and information imperfections	Communication technologies (e.g. Fax, mobile phones, e-mail) and telecommunication infrastructure	'In telecommunications infrastructure, the NICs have adopted digital, electronics-based systems faster than advanced countries have. Less committed to older technologies and suppliers, they leaped to advanced electronics' (Hanna <i>et al.</i> , 1996: 190).
Adoption of information technology enhances comparative advantage of adopting firms and countries at expense of non-adopters	Industrial technologies such as CAD/CAM and NCMTs (numerically controlled machine tools).	'Advances in computing and telecommunications in the 1980s shifted the focus ... towards exploiting this generic technology to increase productivity and competitiveness. The user-oriented strategy of Singapore is clearly a successful model and it suggests that the main returns from the IT revolution come from wide diffusion. Diffusion programs of the NICs have also emphasized low-cost extension of relatively mature applications' (Hanna <i>et al.</i> , 1996: 214–15).
Rapid growth of electronics exports raises ratio of trade to global output	Electronics (e.g. computers, peripherals, diodes)	'The desire to "catch up" and export, helped shape the external outlook of policymakers ... in Japan and the NICs. Their orientation has been most pronounced in dynamic industries like electronics' (Hanna <i>et al.</i> , 1996: 188).
Information technology promotes strategic alliances by multinational corporations	Information technology in general	'Intelligent infrastructures have ... supported ... international strategic alliances' (Hanna <i>et al.</i> , 1996: 184). 'The first-tier NICs have invested ... in their own technological capabilities, to become attractive partners for strategic alliance' (Hanna <i>et al.</i> , 1996: 214).

Source: First two columns based on James (1999).

making. Such arrangements have blocked visions towards deregulation and increased conflict in adopting the most appropriate deregulation and privatization models based on national situations' (Adam, 1996: 137–8).

Other observers of that region have noted how government policies have sometimes discouraged the adoption of computers as when, for instance, import and other taxes are levied on these products (Wangwe and Musonda, 1998).

We turn now to examine how the effects of the policy differences between countries that have just been described, were intensified still further by underlying patterns of cumulative causation in the global economic system. Before so doing, however, it is well to emphasize that our argument in this section is not that information technology alone has been responsible for the successful global integration of the NICs. Our view, rather, is that this form of technology is merely one among many other factors that have contributed to this outcome. By isolating the relatively neglected technological variable, we are hoping to redress the existing imbalance in the literature.

5 INFORMATION TECHNOLOGY AND CUMULATIVE CAUSATION IN THE GLOBAL ECONOMY

As espoused by Myrdal in his *Economic Theory and Under-Developed Regions* (1957), the notion of cumulative causation is fundamentally a critique of the idea of a stable equilibrium, on which neo-classical economic theory in general and international trade theory in particular so heavily rely. For, whereas this latter concept implies that an initial change will 'regularly call forth' a set of countervailing changes in the 'opposite direction' (Myrdal, 1957: 13), Myrdal suggests instead that, in general:

there is no such tendency towards automatic self-stabilisation . . .

The system is by itself not moving towards any sort of balance between forces, but is constantly on the move away from such a situation. In the normal case a change does not call forth countervailing changes but, instead, supporting changes, which move the system in the same direction as the first change but much further.

(Myrdal, 1957: 13)

For Myrdal, the principle of cumulative causation applies as much between as within countries and with reference to both cases his contention is that unfettered flows of capital and free trade tend to favour the richer and more prosperous regions at the expense of the poorer. For in both cases the growing regions 'will exert a strong agglomerative pull, accelerating their rate of growth and bringing stagnation or decline in other parts. No offsetting forces arise to prevent the acceleration of

this shift of economic activity from decadent to progressive regions' (Higgins, 1959: 275). The former regions, that is to say, tend to suffer from the 'backwash effects' of expansion in the latter.

In the international context, there are a large number of factors that could precipitate a cumulative spiral of this kind (including, for example, an unfavourable movement in the terms of trade for the poorer regions of the world). Our concern here, however, is with the cumulative mechanisms that are *associated specifically with the spread of information technologies of one kind or another*. Note that Table 1 does not capture any such mechanisms because it reflects only the *individual* contributions made by these technologies to global integration. Note also that by increasing the scope for international trade and foreign investment through the mechanisms described in that table, information technology *itself* helps to create a global economic environment in which the Myrdalian patterns of cumulative causation will operate most intensively.

In order to describe the specific forms of cumulative causation that are associated with this form of technology, however, one needs to recognize that it bears not only on the *extent* of global integration, but also on the *form* of competition in the system thus created. In particular, information technology has contributed to an environment in which:

it has become increasingly difficult to become competitive by focusing exclusively on low production costs. In former times, performance on price was typically the key to gaining and losing market shares, and this is still the case in some industries. Yet, in most industries, focusing solely on price is no longer an effective strategy for obtaining international competitiveness. The pressure to produce and sell high-quality products in combination with attractive prices requires high and continuously increasing product quality, timeliness of service, flexibility, rapid and continuous innovation.

(OECD, 1993: 98)

As an illustration of this new form of competition and the role played by information technology therein let us first consider the textile and clothing industry, where, according to Elson, the 'application of computer technology' has given rise to the so-called 'quick response system', which is characterized by 'rapid information flows between the retailer, the clothing manufacturer, the textile mill and the fibre producer, permitting delivery of garments to the shops within a shorter period of time' (Elson, 1994: 206-7). In practice, this system is well illustrated by the way in which:

Liz Claiborne's international network has linked clothing factories in China, Hong Kong, Korea, the Phillipines, Singapore, and Taiwan

in an EDI [electronic document interchange] system linked to headquarters in New York. This system coordinates fifty steps between raw goods delivery, and final product, reducing sample approval and production changeover time from days to hours. EDI systems have enabled Hong Kong's clothing manufacturers to remain competitive.

(Hanna *et al.*, 1996: 146)

The influence of the new competition is also being felt in the footwear industry where for firms such as Nike, 'Reaction times to market shifts and competitor strategy are becoming increasingly important' (Donaghu and Barff, 1990: 546). And no less than in textiles and clothing, this demand for speed and flexibility in the global market place is being met, among other ways, by the use of information technology. To quote again from the Nike case, for example, it is notable that:

Design and marketing are done by the parent firm, with new designs relayed by satellite to a computer-aided manufacturing (CAD/CAM) facility run by a subcontractor in Taiwan Province of China. Prototypes are constructed and modified, and final plans are sent by facsimile to subcontractors throughout the region.

(UNCTAD, 1993: 120).

The main point we wish to draw from the examples that have just been provided, as well as from many others that could easily be cited,⁴ is that participation in the new form of competition by any particular developing country appears to be predicated on the availability of information technology in one form or another. And it is not without good reason that the developing countries cited in those examples tended to be drawn from the East Asian NICs, for it is there that information technology has been diffused most widely. Poorer regions by contrast will find themselves excluded from the new competition by the unavailability of such technology, regardless of how large a labour cost advantage they may enjoy. 'Africa's comparative advantage of surplus labour relative to capital', for example, is described by one author as 'becoming irrelevant' (Adam, 1996: 35). Expressed in Myrdalian terms, what this means is that Africa and certain other relatively poor developing countries will tend to suffer from 'the backwash effect' of the introduction of information technologies in other, more advanced regions.⁵

What is more, the inegalitarian impact on developing countries thus induced by the new technologies will be intensified still further by a number of forces acting in the cumulative manner that Myrdal would have predicted. The first of these has to do with the closeness of the relationship between foreign investment and exports that information technology itself has helped to foster. In particular, through its 'distance shrinking' effects, this technology permits multinational corporations to

disperse their global production activities to a far greater extent than was hitherto possible and what emerges as a result is a correspondingly larger number of export platforms in an integrated system of production spread across a variety of different countries. 'Foreign affiliates', that is to say, 'no longer need to be freestanding and miniature versions of parent firms. Rather, they can fulfil specialized tasks in the framework of a global intra-firm division of labour, and trade the results via international communication networks' (UNCTAD, 1996: 106).

In the developing countries that manage to form part of such networks, therefore, affiliates tend to be platforms for exports and to this extent, the initial globalizing influence exerted by foreign direct investment is *compounded* by the trade dimension of globalization. These two components of globalization, that is to say, are not independent of one another (as is suggested in Table 1), *but are instead closely intertwined in the global system that information technology has helped to create*. This relationship is made still closer, moreover, by the fact that knowledge spill over, in the form of technology diffusion by multinationals to local suppliers often enables the latter to enter export markets as well. 'Several developing countries', for example, 'have been able to improve their export performance due to the export activities of foreign affiliates and of indigenous firms with linkages to them' (UNCTAD, 1995: 224).

Given the relationships described in the two previous paragraphs, it is hardly surprising that foreign investment should turn out to be a major determinant of export performance in developing countries. At least one empirical analysis of the issue, for example, has found that 'export competitiveness [in developing countries] is significantly influenced by the activities of foreign-owned firms within the domestic economy' (Narula and Wakelin, 1995: 21). Nor, one should emphasize, is the observed closeness of the connection between foreign investment and export performance, the only link in the ultimate chain of cumulative causation that we are here seeking to describe. For, to the extent that exports lead to economic growth, still more foreign investment will tend to be forthcoming since multinationals are generally attracted to fast-growing countries, as opposed to those that are not growing or growing less rapidly. At some point in this cumulative process, moreover, agglomeration economies are also likely to make their presence felt, favouring countries with an initial locational advantage at the expense of countries that are initially disadvantaged.⁶ In this way, therefore, any initial locational advantages enjoyed by one particular group of countries are likely to cumulate rather than narrow over time (as the experience of the Asian NICs in relation to other developing countries amply seems to demonstrate).

Whereas the cumulative processes that have just been described turn mainly on the inter-relationships between foreign direct investment,

exports and economic growth, another chain of causation begins with the recognition that the generation of new technology cannot be separated from the subsequent patterns of its adoption and diffusion and hence, ultimately, its impact on international competitiveness and globalization. More specifically, what has to be recognized is that because the diffusion of new knowledge is usually far from perfect (especially from developed to developing countries), 'self-reinforcing advantages' tend to accrue to the firms and countries in which the new technology originates. While some firms and countries, that is to say, will be able continuously to appropriate for themselves the stream of innovations thus engendered, other firms and countries, for one reason or another, will remain excluded and the gap in competitiveness between the two groups will accordingly tend to widen over time.

In the specific case of information technology, much of the new knowledge that is created seems to emerge from the strategic alliances referred to earlier (most of which, in turn, are formed in the area of information and other new technologies). Although the participants in most such alliances are located in the developed countries, some firms from developing countries have also been engaged in the process. According to the most recent data from among the latter group of countries, 'firms based in East Asia were particularly active in forming alliances. Records involving Asian firms (excluding the Asian republics of the former Soviet Union) accounted for 61.6 per cent of the total for non-OECD countries' (Vonortas and Safioleas, 1997: 664). 'The large majority of IT [information technology] alliances' in which these firms were engaged, led, it seems, to 'the creation, exchange, or transfer of technological knowledge' (Vonortas and Safioleas, 1997: 668). And by means of the knowledge thus acquired, the firms concerned would better be able 'to compete in international IT markets'. As such and in light of the fact that the acquisition of knowledge in information technology is itself cumulative in character, what appears to be happening is that the existing competitive advantages bestowed by this technology on the East Asian NICs, in relation to most other developing countries, are becoming 'self-reinforcing' in a process of continuous technical change.⁷ (This again, we should emphasize, is not a chain of causation that is captured in Table 1, where the generation and diffusion of information technology are implicitly treated as separate processes).

6 CONCLUSIONS

This paper has sought to contribute to our understanding of the highly unequal patterns of globalization exhibited by developing countries over the past decade or so. We have argued that these patterns can be explained partly by differences in the degree to which developing

countries have exploited the various ways in which information technology can serve as an instrument of integration into the global economy. Some countries, it seems, have explicitly sought to exploit the full range of integrative possibilities afforded by this technology and they have also benefited from a number of powerful cumulative mechanisms that have further enhanced the extent of their integration (via international trade and foreign investment) into the global economy. Other countries, by contrast, have made little effort to exploit information technology as a tool for globalization and they may indeed have suffered from the accompanying 'backwash' effects of the expansion of trade and foreign investment in the former group of countries. These differential effects of information technology on globalization need thus to be viewed from the perspective of Myrdal's notion of cumulative causation, rather than a framework which envisages the technological (or indeed any other form of) convergence of developing countries with one another.

It also follows from the Myrdalian framework that countries currently being marginalized by the processes of globalization need to embark upon a concerted set of policy measures that will redress the situation. Indeed:

The hypothesis of circular causation, which tends to be the doctrine of despair for the poorer countries as long as they leave things to take their natural course, holds out glittering prizes for a policy of purposive interferences. Applied to a goal-directed national endeavour it promises results much bigger than the efforts implied – if the efforts succeed in starting a cumulative process upwards. (Myrdal, 1957: 85)

The point here is that in principle cumulative causation can cut both ways. On the one hand, as emphasized above, it can operate to make poor countries even poorer. But with the appropriate choice of policy instruments, it can produce positive results that are much greater than the sum of the individual instruments (as evidenced, most forcefully by the experience of the East Asian 'tigers').

NOTES

- 1 The following two sections draw heavily on James (1999).
- 2 The quotation as a whole is taken from James (1999: 10).
- 3 For a full discussion of these emerging phenomena see US Department of Commerce, 1998.
- 4 In the case of service activities, for example, there is a potentially vast market in offshore data processing. The Caribbean region appears to have been particularly successful in attracting foreign investment in this type of service activity.
- 5 In the clothing industry, for example, 'a new phase of technological advances, new marketing strategies focused on very short life cycles' have had

- 'consequent impacts on the exports of many developing countries, where the modern version of transnational putting-out had been practised for over a decade' (Chesnaï, 1995: 19).
- 6 The importance of agglomeration economies in the locational decisions of multinational corporations has been demonstrated empirically by Wheeler and Mody (1988).
 - 7 See also the discussion in Freeman and Hagedoorn (1995).

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